

# Overview of testing, demonstrating, and evaluating UAS for meeting NOAA's observing requirements and meeting the challenges of transitioning from research to operations

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# **Vision of NOAA Observing System Council**

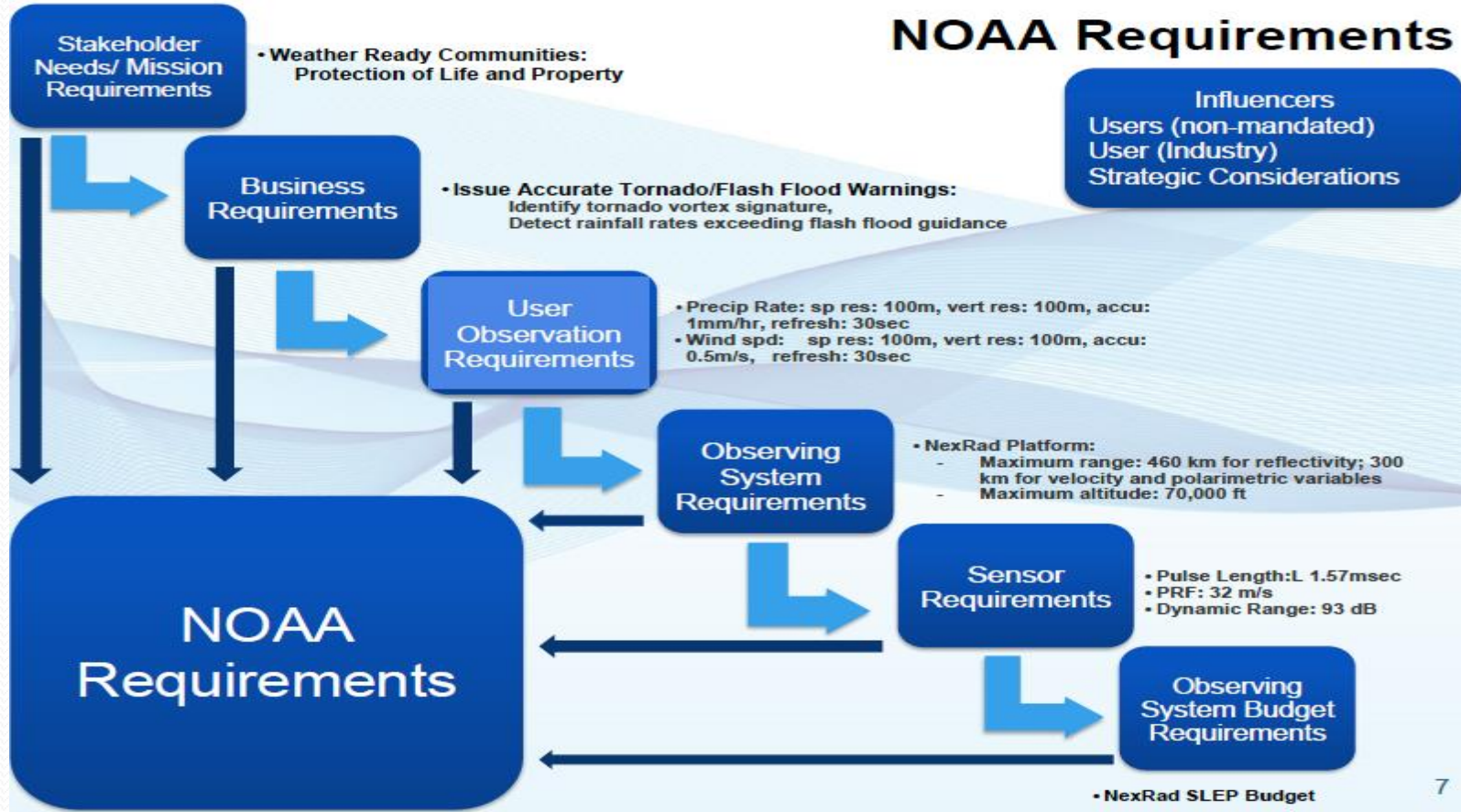
**Achieve and sustain an observing system portfolio which is mission-effective, integrated, adaptable, and affordable**

# Definition of Operations

**Operations – Sustained, systematic, reliable, and robust mission activities with an institutional commitment to deliver specified products or services.**

*- Defined by NOAA Administrative Order 216-105A: Policy on Research and Development Transitions*

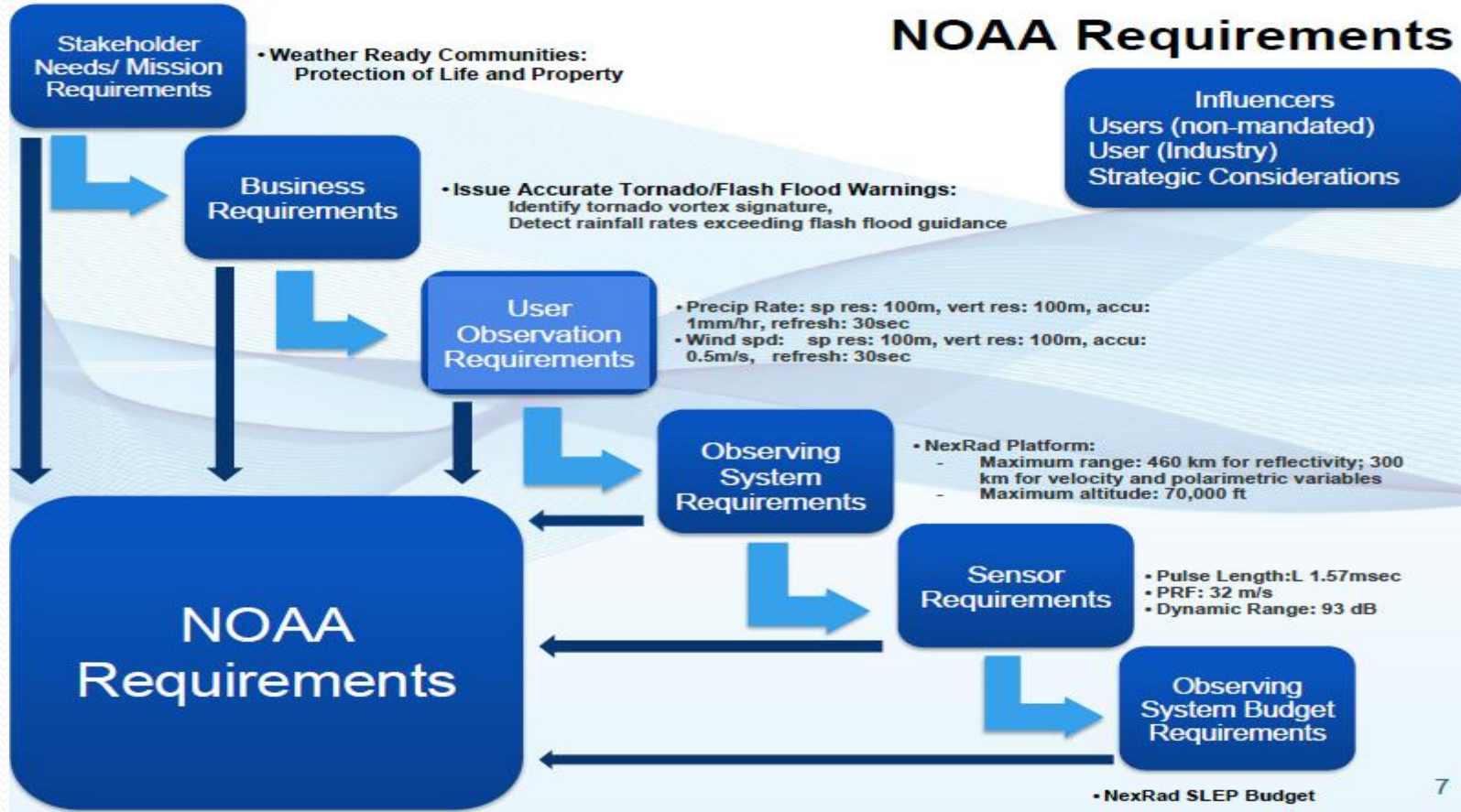
# NOAA Requirements



# UAS Program Definitions

- Unmanned Observing Platform – *unmanned aircraft or marine system with launch, recovery, communication, and ground control packages*
- Payload Sensor – *instrument capable of collecting observation from an observing platform*
- Observing System - *Payload, platform, data storage components working as a system to acquire an observation*
- Observing Strategy – *application of a process or plan to use an observing system to acquire an observation*

# NOAA Requirements



# Planning for Transition from Research to Operations

- Commitment from stakeholder to consider operational implementation
- Plan between partners for advancing readiness levels
- Considerations for concept of operations for data acquisition, data management, training, staffing, budget



# Examples of UAS Program Transitions with Institutional Commitments

- **NOS Rotary Wing**
  - MD4-1000 purchased for NMFS
  - Used operationally by NOS with potential for OAR operations
- **NOS Optionally Piloted Aircraft**
  - Partnership with GRAV-D Program
  - Developed through SBIR Program
- **UAS Payloads**
  - Air chemistry payload
  - Autonomous dropsonde system (??)



# Opportunities for Observing Strategy Development and Demonstration

- **UAS Program Incubator Call for Proposals**
  - *Expected to be released in December 2016*
  - *Two year projects*
- **SBIR Program Subtopics**
- **External partnerships**
  - *Federal, State, Tribal*
  - *International*
  - *Private Industry*
- **UAS Testbeds**
  - *Sensing Hazards for Operational Unmanned Technology (SHOUT) – High impact weather and flooding*
  - *Cross-Line Office Testbed – Development of common observing strategies for multiple Line Office applications*



# Backup Slides

# Critical Elements Needed to Mature a Complete Observing Strategy



# Definitions provided by NOAA Administrative Order 216-105A:

## *Policy on Research and Development Transitions*

- **Application** – The use of NOAA R&D output as a system, process, product, service or tool.
- **Demonstration** – Activities that are part of R&D and are intended to prove or to test whether a technology or method does, in fact, work.
- **Deployment** – The sustained operations, maintenances and use of the product of R&.
- **Development** – The systematic work which is directed to producing new products or processes or improving existing products or processes.
- **Operations** – Sustained, systematic, reliable, and robust mission activities with an institutional commitment to deliver specified products or services.
- **Readiness Levels** – A systematic project metric system that supports assessments of the maturity of R&D projects from research to operation, application, commercial product or service, or other use and allows the consistent comparison of maturity between different types of R&D projects.

# Observing Requirements

## Documentation

- **NOAA mission area:**
- **NOAA priority Area:**
- **Observations needed:**
- **Data product required:**
  - **Spatial resolution of data product:**
  - **Spatial coverage:**
  - **Geographic location:**
  - **Temporal resolution:**
  - **Temporal coverage:**
  - **Data product latency:**

# Observing System Performance Requirements

## Platform

- Operational environment
- Altitude or depth
- Speed
- Endurance
- Range
- Communication spectrum

## Payload Sensor

- Operational environment
- Sensor weight
- Sensor dimensions
- Sensor sampling frequency
- Data Accuracy
- Power requirements
- Payload data system requirements
- Data transmission requirements

## Information Storage System

- Data volume
- Data ingest rate
- Data storage period
- Data delivery requirements
- User data request requirements

# Observing Strategy Documentation

- Line Office observing need
- UAS observing strategy to be developed or demonstrated
- Method for obtaining UAS observations
  - *Data Buy*
  - *Contractor Owned / Contractor Operated*
  - *Contractor Owned / Government Operated*
  - *Government Owned / Contractor Operated*
  - *Government Owned / Government Operated*
- Observing strategy planning
  - *Analysis of alternatives and NEPA assessment*
  - *Line Office approval for acquisition plan*
  - *Line Office approval for staffing plan*
  - *OMAO assessment for operational risk management*
  - *OMAO approval of UAS operations plan*